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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.** 10/508,751	**Applicant(s)** PICHLER ET AL.	
	Examiner LI LIU	**Art Unit** 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 August 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *15 and 17-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *15 and 17-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 August 2008* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 15 and 17-29 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 15 and 17-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant admitted prior art (AAPA: Figure 1 is a known optical cross-connect, and page 3 line 22 to page 6 line 6, and page 10 line 1) in view of Guild et al (US 2003/0152072) and Noirie et al (Noirie et al: "Impact of intermediate traffic grouping on the dimensioning of multi-granularity optical networks", OFC 2001, vol. 2, 2001, pages TuG3-1 to TuG3-3).

1). With regard to claim 15, the AAPA discloses an optical cross-connect (OXC) for use in a wavelength division multiplex (WDM) network (Figure 1), comprising:

a) a plurality of optical inputs (I1 to IM in Figure 1) for receiving respective WDM communication bearing radiation having channels;

b) a plurality of optical outputs (O1 to OM in Figure 1) for outputting the respective WDM radiation switched by the OXC;

c) a single stage optical switching matrix (S1 to SN in Figure 1) for switching the WDM radiation between the optical inputs and outputs, the optical switching matrix comprising a respective switching matrix for each wavelength channel of the WDM radiation (page 3 line 22 to page 6 line 6);

d) a further plurality of optical inputs (e.g., the ADD ports λ1 to λN in Figure 1) and outputs (e.g., the DROP ports λN to λ1 in Figure 1) for respectively adding and dropping selected wavelength channels.

But, the AAPA does not expressly disclose a respective multistage optical switching matrix for selectively connecting the further plurality of optical inputs and outputs to inputs and outputs of the single stage switching matrix, the multistage switching matrix comprising a multistage Clos network in which the single stage switching matrix comprises one stage of the Clos network.

However, Guild et al, in the same field of endeavor, discloses a multistage optical switching matrix (e.g., the switches 402, 404 and 406 in Figure 8) for selectively connecting the further plurality of optical inputs (the inputs to switch 406) to inputs the single stage switching matrix ([0061]). And Guild et al also discloses a multistage optical switching matrix (e.g., the switches 403, 405 and 407 in Figure 8) for selectively connecting the further plurality of optical outputs (the output ports associated with switch 407) to the drop paths (e.g., 409 in Figure 8). By using multi-stage switching matrix, Guild provides full interconnectivity between all the incoming channels that can potentially be dropped locally and the transponders that are associated with clients.

But, Guild et al uses total four switching matrix. Guild et al does not expressly disclose the multistage switching matrix comprising a multistage Clos network in which the single stage switching matrix comprises one stage of the Clos network.

However, Noirie et al teaches a three-stage switching matrix that can be used in the optical cross connection networks (Figure 1), and the multistage switching matrix comprising a multistage Clos network in which the single stage switching matrix (e.g., the Spacing-switch FXC in Figure 1) comprises one stage of the Clos network (the so-called Clos network have three stages, each stage is made of a number of switches; the cross-connect architecture in Figure 1 can be viewed to be formed by a Clos network: first stage matrix “Spacing-switch FXC”, second stage matrix “Spacing-switch BXC”, and third stage “Spacing-switch WXC”. And, the inputs and outputs of the Space-switch BXC in the multistage optical switching matrix are selectively connected to the inputs and outputs of the single stage switching matrix Space-switch FXC).

Therefore, the combination of the AAPA and Guild et al and Noirie et al discloses a system shown as following Figure O1:

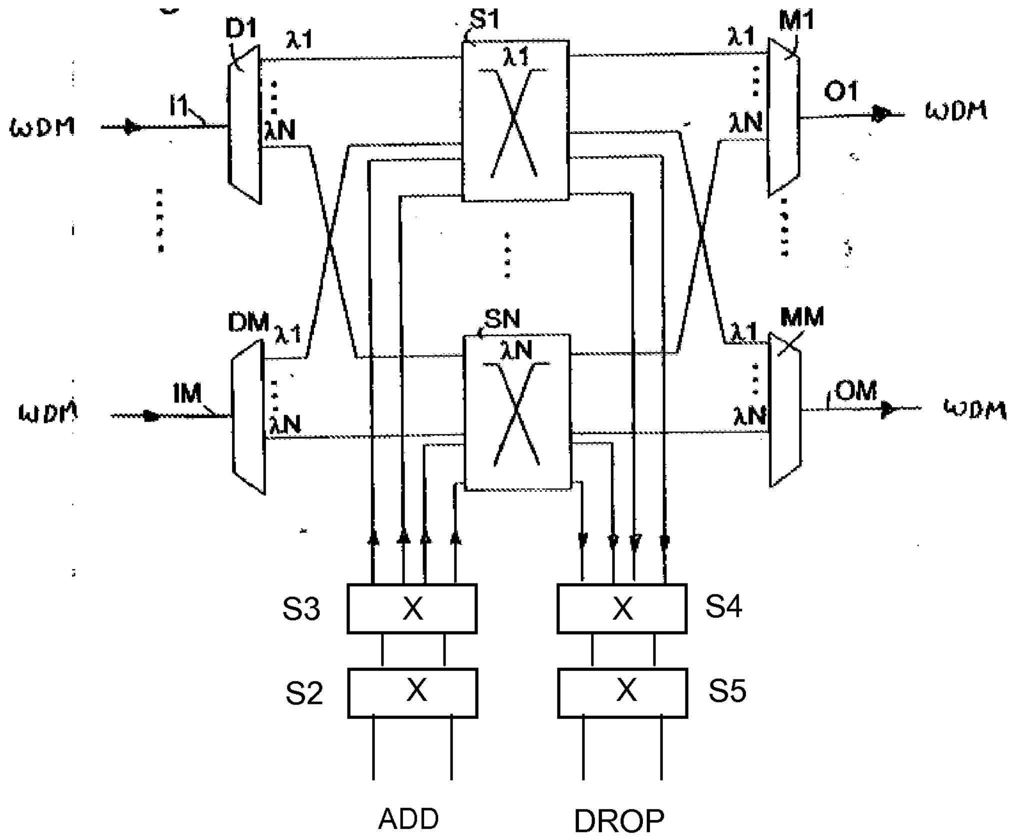

Figure O1

That is, the combination of the AAPA and Guild and Noirie et al teach a multistage optical switching matrix for selectively connecting the further plurality of optical inputs and outputs to inputs and outputs of the single stage switching matrix, the multistage switching matrix comprising a multistage Clos network in which the single stage switching matrix comprises one stage of the Clos network.

Guild et al teaches that the multi-stage switching matrix can be used in the add and drop paths, and the multistage switching network provides full interconnectivity between all the incoming channels that can potentially be dropped locally and the

transponders that are associated with clients, and any dropped wavelength channel originating from any input fibre can be directed to any transponder. In addition, the architecture provides full connectivity between the added wavelength channels originating from clients and the input ports of the switching interface, thus enabling routing of any channel that is added locally to any available switch interface unit. While Guild uses total four switching matrix to form the OXC architecture, at the same time it provides the motivation for one of ordinary skill in the art to explore other number of switching matrix to enable the full connectivity between the clients and the input ports of the switch interface unit, and at same time, reduce the complexity of the OXC architecture and system cost. And Noirie et al discloses that the three stage switching matrix can perform the wavelength routings and can meet the capacity increase, and the system is less complexity and the cost can be reduced.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the teaching of Guild and Noirie et al to the system of AAPA so that the system provides a non-blocking switching and enables routing of any channel that is added or dropped, and enables the full interconnectivity between all the incoming channels that can potentially be dropped locally and the transponders that are associated with clients while maintaining a complexity and cost at an appropriate level.

2). With regard to claim 17, the AAPA discloses an optical cross-connect (Figure 1), comprising:

a) a plurality of input channels (I1 to IM in Figure 1) for through traffic;

b) a plurality of output channels (O1 to OM in Figure 1) for the through traffic;

c) a first group of optical switching matrices (S1 to SN in Figure 1) for connecting each through traffic input channel to any of the through traffic output channels, each through traffic input channel being connected to an input of a switching matrix of the first group, and each through traffic output channel being connected to an output of the switching matrix of the first group (Figure 1, and page 3 line 22 to page 6 line 6); and

d) a third plurality of input channels for adding traffic (e.g., the ADD ports $\lambda 1$ to λN in Figure 1).

But, the AAPA does not expressly disclose each of the input channels add traffic input channel being connected to an input of a second group of switching matrices, wherein outputs of the second group of switching matrices are connected to inputs of a third group of switching matrices, and outputs of the third group of switching matrices are connected to inputs of the first group of switching matrices such that the switching matrices of the second, third and first groups form a Clos network.

However, Guild et al, in the same field of endeavor, discloses a multistage optical switching matrix, in which each of the input channels (the inputs to switch 406) add traffic input channel being connected to an input of a second group of switching matrices (e.g., the switch 406 in Figure 8), wherein outputs of the second group of switching matrices are connected to inputs of a third group of switching matrices (e.g., the switch 404 in Figure 8), and outputs of the third group of switching matrices are connected to inputs of the another group of switching matrices (402 in Figure 8), and the output from the switching matrix 402 is connected to the inputs of the first group of

the switching matrices. By using multi-stage switching matrix, Guild provides full interconnectivity between all the incoming channels that can potentially be dropped locally and the transponders that are associated with clients.

But, Guild et al uses total four switching matrix. Guild et al does not expressly disclose that the outputs of the third group of switching matrices are connected to inputs of the first group of switching matrices such that the switching matrices of the second, third and first groups form a Clos network.

However, Noirie et al teaches a three-stage switching matrix that can be used in the optical cross connection networks (Figure 1), and the outputs of the third group (e.g., the Space-switch BXC in Figure 1) of switching matrices are connected to inputs of the first group (e.g., Space-switch FXC in Figure 1) of switching matrices such that the switching matrices of the second (e.g., the Space-switch WXC in Figure 1), third and first groups form a Clos network (the so-called Cols network have three stages, each stage is made of a number of switches; the cross-connect architecture in Figure 1 can be viewed to be formed by a Clos network: first stage matrix “Spacing-switch FXC”, second stage matrix “Spacing-switch BXC”, and third stage “Spacing-switch WXC. And each add traffic input channel Add W is connected to an input of the Space-switch WXC of switching matrices, wherein outputs of the Space-switch WXC are connected to inputs of the Spacing-switch BXC switching matrices).

That is, the combination of the AAPA and Guild and Noirie et al teach a multistage optical switching matrix (as shown in Figure O1 above), and the switching matrices of the second, third and first groups form a Clos network.

Guild et al teaches that the multi-stage switching matrix can be used in the add and drop paths, and the multistage switching network provides full interconnectivity between all the incoming channels that can potentially be dropped locally and the transponders that are associated with clients, and any dropped wavelength channel originating from any input fibre can be directed to any transponder. In addition, the architecture provides full connectivity between the added wavelength channels originating from clients and the input ports of the switching interface, thus enabling routing of any channel that is added locally to any available switch interface unit. While Guild uses total four switching matrix to form the OXC architecture, at the same time it provides the motivation for one of ordinary skill in the art to explore other number of switching matrix to enable the full connectivity between the clients and the input ports of the switch interface unit, and at same time, reduce the complexity of the OXC architecture and system cost. And Noirie et al discloses that the three stage switching matrix can perform the wavelength routings and can meet the capacity increase, and the system is less complexity and the cost can be reduced.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the teaching of Guild and Noirie et al to the system of AAPA so that the system provides a non-blocking switching and enables routing of any channel that is added or dropped, and enables the full interconnectivity between all the incoming channels that can potentially be dropped locally and the transponders that are associated with clients while maintaining a complexity and cost at an appropriate level.

3). With regard to claim 18, the AAPA and Guild et al and Noirie et al disclose all of the subject matter as applied to claim 17 above. And the AAPA and Guild et al and Noirie et al further disclose the OXC comprising a plurality of demultiplexers (D1 to DM in Figure 1 of the AAPA), each having an input for connection to an optical input which carries WDM radiation comprising a plurality of wavelength channels (e.g., $\lambda 1$ to λN in Figure 1), and a plurality of outputs for outputting one of these wavelength channels to one of the through traffic input channels (page 3 line 22 to page 6 line 6).

4). With regard to claim 19, the AAPA and Guild et al and Noirie et al disclose all of the subject matter as applied to claims 17 and 18above. And the AAPA and Guild et al and Noirie et al further disclose each demultiplexer is connected to each switching matrix of the first group by one input channel (Figure 1 of the AAPA or Figure O1 above, page 3 line 22 to page 6 line 6).

5). With regard to claim 20, the AAPA and Guild et al and Noirie et al disclose all of the subject matter as applied to claims 17 and 18 above. And the AAPA and Guild et al and Noirie et al further disclose the demultiplexers are wavelength demultiplexers (Figure 1 of the AAPA, or Figure O1 above, the demultiplexer is a wavelength demultiplexer) outputting a respective wavelength channel to an output defined according to a carrier wavelength of the wavelength channel, and the outputs of various demultiplexers for outputting the wavelength channels of a same carrier wavelength are connected to a same switching matrix of the first group (Figure 1 of the AAPA, or Figure O1 above, page 3 line 22 to page 6 line 6).

6). With regard to claim 21, the AAPA and Guild et al and Noirie et al disclose all of the subject matter as applied to claim 17 above. But, the AAPA and Guild et al and Noirie et al disclose does not expressly disclose wherein each switching matrix of the second group has a number M of inputs for adding traffic, and a number of at least 2M-1 outputs connected to inputs of switching matrices of the third group. However, since Guild et al and Noirie et al teach that the second group is the first stage of the Clos network, therefore, based the Clos architecture, it is obvious that the second group can be made to have a number M of inputs for adding traffic, and a number of at least 2M-1 outputs connected to inputs of switching matrices of the third group so to provide full interconnectivity between all the incoming channels that can potentially be dropped locally and the clients, and any dropped wavelength channel originating from any input fibre can be directed to any client.

7). With regard to claim 22, the AAPA and Guild et al disclose all of the subject matter as applied to claim 17 above. And the AAPA and Guild et al disclose further disclose wherein each optical switching matrix of the first group has a number M of outputs for through traffic (Figure 1 of the AAPA or Figure O1 above, the number of outputs of each optical switching matrix of the first group has a number M of outputs which is the same as the number of multiplexers O1 to OM), and a number of at least 2M-1 inputs connected to outputs of switching matrices of the third group (the AAPA discloses that the number of inputs can be M+N, when N is greater than M, the number of inputs is greater than 2M-1).

8). With regard to claim 23, the AAPA discloses an optical cross-connect (Figure 1), comprising:

a) a plurality of input channels (I1 to IM in Figure 1) for through traffic;

b) a plurality of output channels (O1 to OM in Figure 1) for the through traffic;

c) a first group of optical switching matrices (S1 to SN in Figure 1) for connecting each through traffic input channel with any of the through traffic output channels, each through traffic input channel being connected to an input of a switching matrix of the first group, and each through traffic output channel being connected to an output of a switching matrix of the first group (Figure 1, and page 3 line 22 to page 6 line 6);

d) a plurality of output channels for dropping traffic (e.g., the DROP ports $\lambda 1$ to λN in Figure 1).

But, the AAPA does not expressly disclose each drop traffic output channel being connected to an output of a fifth group of switching matrices, wherein inputs of the fifth group of switching matrices are connected to outputs of a fourth group of switching matrices, and inputs of the fourth group of switching matrices are connected to outputs of the first group of switching matrices such that the switching matrices of the first, fourth and fifth groups form a Clos network.

However, Guild et al, in the same field of endeavor, discloses a multistage optical switching matrix, in which each drop traffic output channel (e.g., the output channel from switch 407 in Figure 8) being connected to an output of a fifth group of switching matrices (407 in Figure 8), wherein inputs of the fifth group of switching matrices are connected to outputs of a fourth group of switching matrices (e.g., the switch 405 in

Figure 8), and inputs of the fourth group of switching matrices are connected to outputs of the another group of switching matrices (e.g., switch 403). By using multi-stage switching matrix, Guild provides full interconnectivity between all the incoming channels that can potentially be dropped locally and the transponders that are associated with clients.

But, Guild et al does not expressly disclose that inputs of the fourth group of switching matrices are connected to outputs of the first group of switching matrices such that the switching matrices of the first, fourth and fifth groups form a Clos network.

However, Noirie et al teaches a three-stage switching matrix that can be used in the optical cross connection networks (Figure 1), and inputs of the fourth group (e.g., the Space-switch BXC in Figure 1) of switching matrices are connected to outputs of the first group (e.g., Space-switch FXC in Figure 1) of switching matrices such that the switching matrices of the first, fourth and fifth (e.g., the Space-switch WXC in Figure 1) groups form a Clos network (the so-called Cols network have three stages, each stage is made of a number of switches; the cross-connect architecture in Figure 1 can be viewed to be formed by a Clos network: first stage matrix “Spacing-switch FXC”, second stage matrix “Spacing-switch BXC”, and third stage “Spacing-switch WXC”. And each drop traffic output channel Drop W is connected to an output of the Space-switch WXC of switching matrices, and inputs of the Space-switch WXC of switching matrices are connected to outputs of the Spacing-switch BXC of switching matrices).

That is the combination of the AAPA and Guild and Noirie et al teach a multistage optical switching matrix (as shown in Figure O1 above), and the switching matrices of the S5, S4 and S1 shown in Figure O1 form a Clos network.

Guild et al teaches that the multi-stage switching matrix can be used in the add and drop paths, and the multistage switching network provides full interconnectivity between all the incoming channels that can potentially be dropped locally and the transponders that are associated with clients, and any dropped wavelength channel originating from any input fibre can be directed to any transponder. In addition, the architecture provides full connectivity between the added wavelength channels originating from clients and the input ports of the switching interface, thus enabling routing of any channel that is added locally to any available switch interface unit. While Guild uses total four switching matrix to form the OXC architecture, at the same time it provides the motivation for one of ordinary skill in the art to explore other number of switching matrix to enable the full connectivity between the clients and the input ports of the switch interface unit, and at same time, reduce the complexity of the OXC architecture and system cost. And Noirie et al discloses that the three stage switching matrix can perform the wavelength routings and can meet the capacity increase, and the system is less complexity and the cost can be reduced.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the teaching of Guild and Noirie et al to the system of AAPA so that the system provides a non-blocking switching and enables routing of any channel that is added or dropped, and enables the full interconnectivity

between all the incoming channels that can potentially be dropped locally and the transponders that are associated with clients while maintaining a complexity and cost at an appropriate level.

9). With regard to claim 24, the AAPA and Guild et al and Noirie et al disclose all of the subject matter as applied to claim 23 above. And the AAPA and Guild et al and Noirie et al further disclose a plurality of multiplexers (M1 to MM in Figure 1 of the AAPA), each having an output for connecting to an optical output which carries WDM radiation comprising a plurality of wavelength channels (e.g., $\lambda 1$ to λN in Figure 1), and a plurality of inputs for inputting one of these wavelength channels from one of the through traffic output channels (page 3 line 22 to page 6 line 6).

10). With regard to claim 25, the AAPA and Guild et al and Noirie et al disclose all of the subject matter as applied to claims 23 and 24 above. And the AAPA and Guild et al and Noirie et al further disclose each multiplexer is connected to each switching matrix of the first group by one output channel (Figure 1 of the AAPA or Figure O1 above).

11). With regard to claim 26, the AAPA and Guild et al and Noirie et al disclose all of the subject matter as applied to claim 23 above. But, the AAPA and Guild et al and Noirie et al do not expressly disclose each optical switching matrix of the fifth group has a number M of outputs for dropping traffic, and a number of at least 2M-1 inputs connected to outputs of switching matrices of the fourth group. However, since Guild et al teaches that the fifth group is the third stage of the Clos network, therefore, based the Clos architecture, it is obvious that the fifth group can be made to have a number M of

outputs for dropping traffic, and a number of at least 2M-1 inputs connected to outputs of switching matrices of the fourth group so to provide full interconnectivity between all the incoming channels that can potentially be dropped locally and the clients, and any dropped wavelength channel originating from any input fibre can be directed to any client.

12). With regard to claim 27, the AAPA and Guild et al and Noirie et al disclose all of the subject matter as applied to claim 23 above. And the AAPA and Guild et al and Noirie et al further disclose each optical switching matrix of the first group has a number M of inputs for through traffic (Figure 1 of the AAPA or Figure O1 above, the number of outputs of each optical switching matrix of the first group has a number M of outputs which is the same as the number of multiplexers O1 to OM), and a number of at least 2M-1 outputs connected to inputs of switching matrices of the fourth group (the AAPA discloses that the number of outputs of each switching matrix of the first group can be M+N, when N is greater than M, the number of inputs is greater than 2M-1).

13). With regard to claims 28 and 29, the AAPA and Guild et al and Noirie et al disclose all of the subject matter as applied to claims 17 and 23 above. And the AAPA and Guild et al and Noirie et al further disclose the second group of optical switching matrices are identical, and the fifth group of optical switching matrices are identical (e.g., [0061], Guild et al teaches that the switches 406 and 407 are at same switching stage of the Clos network, based on the architecture of the Clos network, the same switching stage is composed of plurality of switch matrices, each switch matrix is made identical).

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Wang et al (US 2003/0185565);

Fevrier et al (US 5,612,805).

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LI LIU whose telephone number is (571)270-1084. The examiner can normally be reached on Mon-Fri, 8:00 am - 5:30 pm, alternating Fri off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/L. L./
Examiner, Art Unit 2613
November 24, 2008

/Kenneth N Vanderpuye/
Supervisory Patent Examiner, Art Unit 2613